

sesame, but persisted in her reticence, the philosopher grew pessimistic and disappointed." "Pessimistic" is the very last adjective to be applied to Lord Kelvin in his cheery and undaunted battling to the last with the deepest problem of mathematical physics. No trace of disappointment soured the serene close of his strenuous life.

There are eight portraits and a score of illustrative cuts in the work, which is well and clearly printed.

### OUR BOOK SHELF.

*Syllabus of the Lessons on Marine Biology for Fishermen, given at the Marine Laboratory, Piel, Barrow-in-Furness, by the Lancashire and Western Sea-Fisheries Joint Committee.* Revised January, 1910. Pp. 35; 7 plates. (Liverpool: C. Tinling and Co., Ltd., 1910.)

THIS handbook, which has been prepared by Mr. James Johnstone, is written in a clear, direct style, and is illustrated by good text-figures and seven excellent plates. The author is to be especially congratulated on the skill with which he has, throughout the book, avoided the use of technical terms without sacrificing scientific accuracy. The desire to avoid the use of the word protoplasm has, however, led to the use of another term in an unusual sense; on p. 13 the author, dealing with Peridinians, writes:—"They, like the diatoms, are jelly-fish, and have shells . . . ." It would be better to avoid the use of the term jelly-fish, in such a connection, in view of its more generally accepted application to organisms of a higher class.

The book contains outlines of lessons on those branches of marine biology which are of special interest to fishermen—the general anatomy, physiology and development of the mussel, the structure of the cockle, the food of these molluscs; the structure of shrimps, crabs and lobsters, their growth, "casting" (ecdysis) and reproduction; the anatomy of the haddock or whiting, the fecundity of various fishes, especially of flat fishes, that of the flounder being studied in detail; the food in the sea, plankton; the different kinds of spawn found on the shore; the elementary chemistry of air and water, the temperature of the sea, &c. This list will serve to show the range of subjects comprised in this admirably planned course of scientific instruction. The book is certain to stimulate the interest, not only of those who attend the classes, but also of other fishermen, to whose notice it will be brought by their more fortunate fellow-workers who have passed through the classes and used the book.

*The Sun a Habitable Body like the Earth.* By Sree Benoybhushan Raha Dass. Pp. xiv+130. (Naldha: Published by the Author, 1909.) Price 5s., or 3 rupees.

THIS is, typically, a book "published (and distributed) by the author," and perhaps the kindest statement to make about it is that it is an anachronism. Apparently the author attempts to explain all solar phenomena as electrical effects, and, as a prelude, describes the actions of, and discharges from, insulated conductors; but the language is so often obscure, and, where intelligible, is so devoid of connected reasoning, that no clear idea can be obtained as to the ultimate conclusions. Quotations from great authorities, including Herschel's conclusion as to the sun's habitability, give the volume itself an air of authority which is rudely dispelled on a closer acquaintance.

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### LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

#### The "Reindeer" from the Lorthet Grotto.

I HAVE just been consulting in *Science Progress* for July, 1909, the very interesting paper of Prof. Sollas on the Palæolithic races, and I venture to direct attention to the title of an illustration on p. 25. It is entitled "Reindeer and Salmon Incised on a Piece of Horn from Lorthet." This legend is taken from the original figure by the late M. Piette in *L'Anthropologie*, 1904, p. 160; but is the *Cervus* there engraved rightly ascribed to *tarandus*? Is it not *megaceros*? *Tarandus* has no brow tines like those delineated on this horn plaque. They are more or less palmated, while in *megaceros* they are differently directed, present a different section, and are bifid as are those figured in *Science Progress*. It may or may not be now or later of importance to ascribe correctly this particular drawing, but the determination of the species in prehistoric cave-engravings has an important bearing on the age and climate of the horizon from which they come.

May I venture, if Prof. Sollas will allow me, to refer also to p. 26 of the same important contribution, where occur the words "... Saiga antelope, the same animal as that which is sculptured in so masterly a manner on the spear-thrower mentioned on p. 20 (Fig. 3)." The animal sculptured—also after M. Piette's figure in *L'Anthropologie*—on the implement (from Mas d'Azil) referred to can hardly be a *Saiga*. The position and form of the nostrils and the uninflated nose-sac which the side-view reveals preclude this determination. The creature must be a goat or a chamois, or belong to a nearly related genus.

HENRY O. FORBES.

The Museums, Liverpool, March 20.

#### Centre of Gravity of Annual Rainfall.

THE ordinary method of exhibiting the annual distribution of rainfall for any station or country is a graph the ordinates of which represent the monthly rainfall. Though this pictorial method is both useful and interesting, it does not lend itself to the ready comparison of a number of such graphs for different places or for the same place in different years. By a similar graphic method we can exhibit the yearly rainfall totals for a number of years, but we cannot show differences of internal distribution for each year unless we are at the trouble to graph each month of each year separately.

Another method, which may be called the analytical method, I have been applying recently to the study of the rainfall of the province of Mysore, India, upon which I had to report officially from 1893 to 1908, and I have been much surprised at the results brought out by this method. The same method applied to the rainfall statistics of England, Scotland, and Ireland, as given by Dr. H. R. Mill in "British Rainfall" for 1908, shows also curious and interesting results.

The method consists in the application of the well-known formula for finding the position of the centre of gravity of a number of weights placed along a straight rod, viz.  $X = \Sigma(wx) \div \Sigma(w)$ . If we imagine the rainfall for the months of the year January, February, . . . , December to be weights placed along an axis at distances 1, 2 . . . 12 units from the Origin, or end of the axis (January 1), multiply each month's rainfall by its distance from the Origin, and divide the sum of the products by the total rainfall for the year, we get the position (or date) at which the year's rainfall might be supposed to have fallen all together to give the same effect as the separate monthly falls.

The Mysore Province, which has about the same area as Scotland without the Isles (28,000 square miles), is divided into eight *Districts*, which differ greatly in the amount of yearly rainfall, as well as in the monthly distribution. Each *District* is divided into a number of

parishes, called *Taluks*, and the rainfall is gauged at the chief town of each *Taluk*. The mean of these is taken as the rainfall for each District. From the average monthly rainfall of each District for the past thirty-nine years I have found the C.G., also for the year 1908, and they are given for comparison:—

District.	No. of Taluks.	Average for 39 years.		1908.	
		Rainfall.	C.G.	Rainfall.	C.G.
1. Bangalore ...	10	30'48	7'93	25'49	6'47
2. Mysore ...	13	27'53	7'74	24'24	6'64
3. Hassan ...	8	37'95	7'62	27'08	6'74
4. Chitaldrug ...	9	21'10	7'51	14'03	6'93
5. Tumkur ...	10	25'90	8'01	15'76	7'00
6. Kolar ...	11	27'89	8'14	16'00	7'07
7. Shimoga ...	9	66'60	7'34	67'31	7'14
8. Kadur ...	7	73'00	7'40	63'74	7'06
Province ...	77	36'79	7'68	29'94	6'91

The Shimoga and Kadur districts each include three stations where the rainfall is enormously greater than at the other stations; yet though the thirty-nine-years' average annual rainfall for six of the Shimoga *Taluk* stations is only 35.78 inches, and for the three stations of great rainfall it is 128.24 inches, I find that the mean position of the C.G. is 7.28 for these three stations, while for the whole nine stations it is 7.34. In the same Shimoga District there are, besides the nine *Taluk* stations, fourteen additional rain-gauge stations, among which are Agumbi, with a mean yearly rainfall of 333.17 inches, Aralagode, with mean of 237.79 inches, and Karur, with mean of 115.79 inches, and I find the C.G. for these is at 7.29, 7.21, and 7.13 respectively.

It is to be noted that the great deficiency of rainfall throughout Mysore Province as a whole for the year 1908 is indicated, not only by the diminished yearly totals, but by the displacements of the C.G. for each District and for the whole Province. This means, of course, that the deficiency was in the "latter rains"—or those for the north-east monsoon—but the important thing is that we have a simple numerical measure, by combining the displacement of the C.G. and the total rainfall defect, of the real rainfall deficiency for the year. Thus while the rainfall average for the whole Province was 18.6 per cent. less than the yearly normal, the deficiency of the *rain-moment*, as we may call it in the language of mechanics, was 26.8 per cent., which agrees better with the agricultural effect.

This has led me to examine Dr. H. R. Mill's "British Rainfall" for 1908, and the results of working out the C.G. for a large number of stations, and for the 1908 mean rainfall of England, Scotland, and Ireland, are interesting. The position of the C.G. for the monthly mean rainfall of 122 stations in England and Wales is 6.54, of 55 stations in Scotland 6.37, of 53 stations in Ireland 6.72, and of 230 stations in the whole British Isles 6.55. For Greenwich, with rainfall 23.78 inches, it is 6.48; for Borrowdale (Cumberland), with rainfall of 127.38 inches, it is 6.54; for Glenquoich (Inverness), with 107.40 inches, it is 6.21; for Kenmare (Co. Kerry), with 70.91 inches, it is 6.59.

From the Journal of the Scottish Meteorological Society for 1908 I find the following results:—

	Year's Rainfall.	C.G.
Means of the eight principal towns of Scotland	33'05	6'54
Means for all Scotland for 1908	37'55	6'48
Means for all Scotland for fifty years (1856–1905)	39'19	6'87
Means for 1908 of eighteen Lighthouses on the Scottish coast	30'74	6'68

It is remarkable that the rainfall should be so small at the Lighthouses, and that the law of rain-distribution throughout the year should agree with that for the land-stations. The smallest rainfall for 1908 was at the Isle of May Lighthouse, where it was only 18.33 inches, with C.G. at 6.90; and the heaviest rainfall was at Ardnurchan Lighthouse, where it was 50.99 inches, with C.G. at 6.63.

This method is readily applicable to the graphic presentation for a series of years either of the C.G. or of the

*rain-moment*. Thus I have worked out the results for Bangalore from 1867 to 1908, and find that while the average position of the C.G. is 7.81, the positions for 1875 and 1876, the successive droughts of which caused the great Mysore famine, were 6.82 and 6.72, and while the average *rain-moment* is 276, it was for those years only 151 and 117 respectively. I also find that for the two years 1907 and 1908 the C.G. for Bangalore was at 6.77 and 6.08 respectively, and that the *rain-moments* were 214 and 157; which agree with the fact that Mysore narrowly escaped another serious famine quite recently, and give a measure of the margin by which it escaped the disaster caused by the rain deficiency of 1875 and 1876.

It is evident that we might easily graph on the same sheet for a sequence of years (1) the total rainfall; (2) its yearly C.G.; and (3) its *rain-moment* or coefficient. This principle will also give the data for charts of the general distribution of rainfall in a country for any year or series of years. That each station and country has its *rain-constant* which can be expressed numerically seems to be more than a mere theoretical curiosity.

J. COOK.

30 Hermitage Gardens, Edinburgh.

### Lycopodium Spores.

MISS EDITH A. STONEY states (*NATURE*, January 6, vol. lxxxii., p. 279) that with a large aperture microscope objective and oblique illumination, *Lycopodium* spores are seen to be coated with hair-like projections. We believe this appearance to be illusory. Owing to the transparency of the outermost layer of cells, the margin of the spore is quite invisible under certain conditions, giving to the radial cell walls the appearance of hair-like projections.

Photomicrographs of some of these spores reproduced in the *Physikalische Zeitschrift* of February 1, p. 78, show the effect in question in some parts of the field, and evidence the correctness of the explanation given.

JOHN ZELENY.

L. W. MCKEEHAN.

### Dr. H. J. Hansen and the Copenhagen Museum of Zoology.

I BEG permission to acknowledge the receipt of the open letter sent me through your Journal of March 10, by the leading zoologists of Great Britain and Ireland, regarding my resignation from the Copenhagen Museum and my zoological investigations. I am deeply conscious of the great honour done me in sending me such an address, and I regret that I am unable to write to all personally; but for that reason I would request them through your columns to accept my most sincere and heartfelt thanks.

H. J. HANSEN.

5te Juni Plads No. 1, Kjöbenhavn, F., March 17.

### Title of the Natural History Museum.

WHAT has history, in its present sense, to do with the subject? What have the Muses to do with it? Certainly Terpsichore is not included at any of the museums. The N.H.M.(B.M.) is not a museum, but a Natureum. Might not a ten-syllable name on the other side of the way be replaced by the Arteum? Then Bloomsbury might use the name Historeum. The address need not include London or England, as no other place uses these terms. For all scientific reference one word would be complete.

W. M. F. P.

### The Meaning of Ionisation.

IN his lecture at the Royal Institution on March 11, Dr. Brereton Baker proposed the term electromerisation instead of ionisation when applied to gases. May I venture to suggest the word "electronisation" as more euphonious, and as indicating the essential difference in the process, viz. the freeing of electrons instead of ions?

W. DEANE BUTCHER.

Holyrood, Ealing, March 18.